

WE CLAIM:

1. A method of refining triglyceride oil to remove contaminants, comprising the steps of:
  - mixing an agglomerating agent with the triglyceride oil to form an oil mixture;
  - cooling the oil mixture;
  - removing at least a portion of the contaminants from the oil mixture;
  - heating the oil mixture;
  - chilling the oil mixture;
  - warming the oil mixture;
  - cooling the oil mixture for a preselected period of time such that the oil mixture at least partially crystallizes thereby forming crystallized matter, the crystallized matter containing contaminants;
  - adding a filter aid to the oil mixture to facilitate filtering; and
  - filtering the crystallized matter from the oil mixture, thereby producing a refined triglyceride oil.
2. The method of claim 1 wherein the preselected time is a period between five and ten hours effective to reduce the temperature of the oil mixture to between approximately 0-10 degrees C.
3. The method of claim 1 wherein the step of removing at least a portion of the contaminants is performed through filtration.
4. The method of claim 1 wherein the refined triglyceride oil contains no more than 0.05% free fatty acids by weight.
5. The method of claim 1 wherein the refined triglyceride oil contains no more than 0.03% free fatty acids by weight.

6. The method of claim 1 wherein the step of heating the oil mixture is effective to liquefy at least a majority of the oil mixture.
7. The method of claim 1 wherein the step of heating the oil mixture is effective to substantially reduce the viscosity of the oil mixture.
8. The method of claim 1 wherein the cooling of the oil mixture is at a predetermined rate effective to establish crystallization.
9. The method of claim 1 wherein the contaminants include free fatty acids.
10. The method of claim 1 wherein the agglomerating agent comprises a soluble silicate solution.
11. The method of claim 1 wherein the agglomerating agent is selected from the group consisting of silica gel, a soluble silicate, amorphous silica, a filter aid, and combinations thereof.
12. The method of claim 1, wherein the filter aid is selected from the group consisting of diatomaceous earth and Fuller's earth.
13. The method of claim 1 wherein the triglyceride oil comprises a vegetable oil.
14. The method of claim 1 wherein the triglyceride oil comprises oil derived from an animal source.
15. The method of claim 1 wherein the triglyceride oil comprises emu oil.
16. The method of claim 1 wherein the mixing of the agglomerating agent is performed while the oil mixture is in a temperature range of 60 to 100 deg C and for a period of time between 15 and 30 minutes.
17. The method of claim 1 wherein the step of cooling the oil mixture results in the oil mixture having a temperature in the range of 0 deg C to 35 deg C.

18. The method of claim 1 wherein the step of cooling the oil mixture is performed in a substantial absence of mechanical mixing.

19. An apparatus for refining crude triglyceride oil to remove contaminants, comprising:

a refining vessel for receiving the crude triglyceride oil and an agglomerating agent to create an oil mixture, the agglomerating agent causing the contaminants in the oil mixture to agglomerate within the refining vessel;

a mixing means operable to mix the agglomerating agent with the crude triglyceride oil;

a cooling means to cool the oil mixture, the cooling means being operable to cool the oil mixture to a predetermined temperature range in a predetermined amount of time;

a warming means operable to warm the oil mixture; and

a separation means to physically separate agglomerated contaminants from the oil mixture.

20. The apparatus of claim 19 wherein the cooling means is operable to establish crystallization in the oil mixture, the crystallization operable to create crystals containing at least a portion of the contaminants.

21. The apparatus of claim 19 wherein the contaminants include free fatty acids.

22. The apparatus of claim 19 wherein the agglomerating agent comprises a silica compound.

23. The apparatus of claim 19 wherein the agglomerating agent is selected from the group consisting of silica gel, a soluble silicate, a filter aid, and combinations thereof.

24. The apparatus of claim 19, wherein the filter aid is selected from the group consisting of diatomaceous earth and Fuller's earth.

25. The apparatus of claim 19 wherein the triglyceride oil comprises oil derived from an animal source.
26. The apparatus of claim 19 wherein the triglyceride oil comprises emu oil.
27. The apparatus of claim 19 wherein the mixing means is effective to substantially mix the agglomerating agent into the triglyceride oil while the oil mixture is in a temperature range of 60 to 100 deg C during a period of time between 15 and 30 minutes.
28. The apparatus of claim 19 wherein the cooling means is operable to cool the oil mixture to a temperature in the range of 0 deg C to 35 deg C.
29. The apparatus of claim 19 wherein the mixing means is operable to suspend mixing during operation of the cooling means.
30. A refined triglyceride oil comprising crude triglyceride oil refined through contact with an agglomerating agent, the agglomerating agent being mixed with the crude triglyceride oil to form an oil mixture, the oil mixture being cooled for a preselected period of time such that the oil mixture crystallizes thereby forming crystallized matter containing contaminants, a filter aid being added to the oil mixture to facilitate physical separation and physical separation means to remove crystallized matter to produce the refined triglyceride oil.